PATENT SPECIFICATION

DRAWINGS ATTACHED

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905,409

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COMPLETE SPECIFICATION

Improved Shuttering System for Casting Concrete

We, SCAFFOLDING (GREAT BRITAIN) LIMITED, a British Company, of Scafco Works, Willow Lane, Mitcham, in the County of Surrey, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to a new or improved shuttering system for use in providing temporary support for overhead shuttering in the laying of concrete slabs and beams which are to constitute a floor or roof. The invention is concerned with a system which employs a plurality of vertical props each of which has at its upper end a support platform for supporting shuttering panels.

In providing shuttering for any particular area, of say a floor, a certain portion such as the central area can be provided by a suitable number of props supporting an appropriate number of panels of square form in plan and of standard size; there remains then the question of support for shuttering to bridge the gap or gaps between this area and the surround which may be walls or beams or both, and of smaller dimensions than the standard panel.

The object of the present inventon is to provide a system which will enable support for shuttering to be provided for any desired area and particularly the said surrounds.

According to the present invention a shuttering system to provide temporary support for overhead shuttering in casting concrete comprises vertically disposed props arranged in horizontally spaced relationship, a support platform on the upper end of each prop, each support platform having spaced apart, upwardly extending projections on its upper surface, shuttering panels, each of square or rectangular shape and having downwardly extending flanges, the shuttering panels being supported upon the platforms by engagement of the said flanges with the projections aforesaid, and elongated extension pieces each having one end part formed so that it can rest upon a platform in the space between two projections on the platform and the other end part being of greater transverse dimension and formed so that it can engage upon a wall, beam or other surrounding or supporting part or upon another extension piece.

The props would be set up in spaced relationship and would preferably be positioned relative to each other and connected together by means of tie rods.

Each platform may be of generally square form having four upstanding projections one at each corner. Preferably the downwardly extending flanges of each shuttering panel may be spaced inwardly from the periphery thereof and there is an outwardly extending web at the upper edge of each flange, and wherein some of the extension pieces are formed and arranged so that the end part of an extension piece which rests upon a platform is trapped between the platform below and the adjacent webs above of the shuttering panels which are supported upon the platform.

Such extension piece may be in the form of a box section girder provided at one end with a flange extending in the horizontal plane and projecting laterally at each side of the girder so as to form a means for locating it against transverse movement by engagement with a vertical face on a surrounding wall or a beam or by engagement with the vertical side of another extension piece upon which the horizontal flange is resting. There may be other extension pieces of similar box girder form each of which is formed at one end with a horizontal laterally projecting flange as above mentioned and at the other end with a projecting flange which is of the same or less width than the width of the girder and can be used for supporting this end of the extension piece upon another extension piece extending at right angles thereto.

The invention is illustrated by way of example in the accompanying drawings wherein:

Figure 1 is a plan view, from above, of the frame of one of the shuttering panels used in the system.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is an enlarged fragmentary section through one of the side members of the shuttering panel.

Figure 4 is a side elevation of one of the extension pieces.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a plan view of the extension piece.

Figure 7 is a plan view, on a reduced scale, of a portion of a shuttering system embodying the invention. Dotted lines indicate areas covered by standard panels.

Figures 8 and 9 are enlarged sections on the lines 8—8, 9—9, of Figures 7.

The props used in the shuttering system may be of adjustable height, or in some cases ordinary scaffold poles of fixed height may be used. Each such prop has its upper end formed to receive a spigot member on the underside of a support platform which is adapted to be placed on the top of the prop.

Referring to Figure 7, and bearing in mind that this is a plan view from above, there will be seen two support platforms 10 each of which is at the upper end of a prop (not seen in the drawings), and, as will be readily understood, the area of shuttering will comprise an appropriate number of these platforms on the upper ends of props, each disposed at the corner of a square area.

For the purpose of simplicity in the drawings, the platform 10 has been shown as having on its top face four upstanding projections 11 one at each corner but in practice we prefer to use an improved form of support platform as described in our co-pending application No. 696/60 (Serial No. 905,410). However, for an understanding of the present invention, the effect is the same, as the platform 10, as illustrated, performs the same function as the improved version referred to in our co-pending application No. 696/60 (Serial No. 905,410).

Each support platform 10 comprises a flat plate having the four upstanding projections 11 and on its underside provided with a spigot in the form of a short length of rod or bar welded to the underside of the plate and adapted to be engaged in the upper end of the prop.

The shuttering panels may be made in various sizes but one of the standard forms of panel for covering the major portion of the area to be shuttered is of square form (see Figures 1 to 3) and comprises a flat piece of wood 12 (Figure 3) supported in a frame having its sides 13 made from members of generally angle-section (Figure 3), connected by cross pieces 14 which may be of channel section as shown in Figure 2, or may be of any other suitable section e.g. angle.

The side members 13 of the frame of each panel have a section which provides a fairly deep downwardly extending vertical flange 15 which is spaced inwardly from a relatively short upper vertical flange 16 the two being connected by a web 17 which is inclined downwardly and outwardly so that when the piece of wood 12 is placed in position in the frame, to make up a panel it rests with its underside upon the portion 18 of this web which is adjacent the inner vertical flange 15 and the part of the web 17 below the edge of the board is spaced away therefrom so as to leave a small gap. This has the advantage that it allows easy fitting of the board in position as the lower corner edges 19 of the board do not have to fit into a right angled corner and the downwardly extending profiles of the web 17 has a further purpose which is referred to hereinafter. The deep vertical flange 15 preferably has the inwardly extending lip 20 at its lower edge for strengthening purposes.

In setting-up shuttering using the equipment above described, the props are first assembled and connected together, each prop having a support platform 10 at its upper end, and then a suitable number of the aforesaid panels are placed upon the support platforms the corner of each panel being engaged over one of the upstanding lugs 11 so that with the corners of four panels resting on one platform, each lug locates its associated panel against outwards displacement whilst the presence of the adjacent panels prevents displacement in the other directions. It will be appreciated that a certain amount of tolerance will be allowed to facilitate easy assembly of the panels upon the support platform.

Referring to Figure 7, it will be appreciated that the central region of the area can be shuttered in the above manner by the use of the square panels, such as the one indicated at 21, supported wholly upon props, and this will then leave the areas such as 22, 23, 24 between this central area and the surround (in the example shown the surround comprises the walls 25).

In order to complete the shuttering of the areas such as 22, 23, 24, we make use of extension pieces, of which there are two kinds, indicated at 26 and 27 respectively in Figure 7, the extension pieces 27 being slightly different from the extension pieces 26.

Referring to Figures 4, 5, 6, each extension piece 26 can be considered as a small box-section girder having at one end a piece of angle-section welded across the open end of the box-section so that one flange 28 of the angle closes the end and forms a vertical face and the other flange 29 of the angle forms a horizontal face which is flush with the upper face of the box section, the width of this angle being slightly less than the width of the box section (see Figure 6).

At the other end of the extension piece 26 a further angle section piece is welded across the open end of the box section, the width of this angle section piece being greater than the width of the box section so that it also provides a vertical flange 30 and a horizontal flange 31 which is flush with the upper face of the box section but projects laterally to each side of the box section at this end (see Figures 5 and 6).

Each extension piece 27 is similarly of box girder form but does not have the small angle 28, 29 at one end, although it has the large angle piece 30, 31 at one of its ends.

Hence, to bridge the gap 24 (Figure 7) between the two platforms 10 and the adjacent wall 25, two of the longer extension pieces 27 are used and, as will be seen by reference to Figure 8, the member 27 rests upon the platform 10 and in between the vertical flanges 15 of the side members of the two square panels which are supported by the platform 10. At its other end the member 27 is supported by its angle section member 30, 31 engaging a block or bracket or similar support secured to the wall 25. The flange 30 may be fastened to such support by screws, nails or the like through the holes 32 (Figure 5) in the flange.

Part of the gap 24 can now be covered by a smaller size standard shuttering panel 33, which is of the same general construction as the square panel, but is of rectangular shape and has an area equal to half the area of the square panel.

To fill the remainder of the gap 24, between the edge of the panel 33 and the wall, use is made of two of the extension pieces 26 supported at their ends upon the two extension pieces 27 and then flat boards 34 (see Figure 9) are laid upon the extension pieces 26.

Comparing Figures 8 and 9, it is essential that the board 12 of the panel 33 should be flush with the boards 34 which are used to fill in the gap and this is guaranteed because the vertical depth of the web 17 of the standard panel is made equal to the thickness of the flange 29 of the extension piece 26 so that, as both are resting upon the top face of the extension piece 27, the boards 12 and 34, being of the same thickness, will have their upper surfaces flush. Therefore, over the whole area to be shuttered, the boards of the standard panels will be flush with the boards which are used to fill in the gaps.

The corner area 23 in Figure 7 is similarly dealt with using extension pieces 26 and boards laid thereon. Two members 26 are shown in Figure 7 each supported by its flange 29 upon the extension piece 27 and, at its other end, having its flanges 31, 30, resting upon, and secured to, respectively, a block or bracket on the wall 25.

A third member 26 will be required to complete the area 23 but to avoid confusion this member has been omitted from the drawings. This third member 26 will be placed so that it extends from the point A on the wall 25 across to the adjacent platform 10. At the point A the flanges 31 and 30 of the member 26 will be supported upon the wall in the same manner as with the other two members 26 and at its other end this third member 26 will have its flange 29 resting upon the extension piece 27 in between the two projections 11 of platform 10.

As it is essential for the board of the standard panel 22 to be flush with the boards which fill in the gap 23, the edge 22a of the panel 22 must not rest upon this third extension piece 26, otherwise the board of the panel 22 would be raised proud by the thickness of the flange 29 on the third extension piece 26. Hence for this position the third extension piece 26 must be disposed so that it is slightly to the right (in plan view) of the centre line through the centre of the platform 10. The working clearances provided between the various parts of the system will allow this slight displacement of the member 26 so that its edge will abut the edge 22a of the panel 22 and the board of the panel will then be flush with the boards over area 23 and flush with the adjoining panels.

The outer edge of the panel 22 can be supported upon suitable blocks or brackets provided on the wall 25.

WHAT WE CLAIM IS:—

1. A shuttering system to provide temporary support for overhead shuttering in casting concrete comprising vertically disposed props arranged in horizontally spaced relationship, a support platform on the upper end of each prop, each support platform having spaced apart, upwardly extending projections on its upper surface, shuttering panels, each of square or rectangular shape and having downwardly extending flanges, the shuttering panels being supported upon the platform by engagement of the said flanges with the projections aforesaid, and elongated extension pieces each having one end part formed so that it can rest upon a platform in the space between two projections on the platform and the other end part being of greater transverse dimension and formed so that it can engage upon a wall, beam or other surrounding or supporting part or upon another extension piece.

2. A shuttering system according to Claim 1 wherein each platform is of generally square form having four upstanding projections, one at each corner.

3. A shuttering system according to Claim 1 wherein the downwardly extending flanges of each shuttering panel are spaced inwardly from the periphery thereof and there is an outwardly extending web at the upper edge of each flange, and wherein some of the extension pieces are formed and arranged so that the end part of an extension piece which rests

upon a platform is trapped between the platform below and the adjacent webs above of the shuttering panels which are supported upon the platform.

4. A shuttering system according to Claim 3 wherein each such extension piece is in the form of a box section girder provided at one end with a flange extending in the horizontal plane and projecting laterally at each side of the girder.

5. A shuttering system according to Claim 5 including extension pieces each of which is in the form of a box section girder provided at one end with a flange extending in the horizontal plane and projecting laterally at each side of the girder and provided at the other end with a longitudinally projecting horizontal flange which is of the same or less width than the width of the girder.

6. A shuttering system substantially as described with reference to and as shown in the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improved Shuttering System for Casting Concrete

We, SCAFFOLDING (GREAT BRITAIN) LIMITED, a British Company, of Scafco Works, Willow Lane, Mitcham, in the County of Surrey, do hereby declare this invention to be described in the following statement:—

This invention relates to a new or improved shuttering system for use in providing temporary support for overhead shuttering in the laying of concrete slabs and beams which are to constitute a floor or roof. The invention is concerned with a system which employs a plurality of vertical props each of which has at its upper end a support platform for supporting shuttering panels.

In providing shuttering for any particular area, of say a floor, a certain portion such as the central area can be provided by a suitable number of props supporting an appropriate number of panels of square form in plan and of standard size; there remains then the question of support for shuttering to bridge the gap or gaps between this area and the surround which may be walls or beams or both and of smaller dimensions than the standard pan.

The object of the present invention is to provide a system which will enable support for shuttering to be provided for any desired area and particularly the said surrounds.

According to the present invention, considered in its broadest aspect, we provide a scaffolding system for this purpose comprising props and support platforms adapted to be disposed on the upper ends of the props, shuttering pans adapted to be supported and located by said platforms and elongated extension pieces each having one end formed so as to be engageable with, or upon, one of said platforms or upon another extension piece and the other end formed so as to be engageable upon a wall, beam or other surrounding or supporting part or upon another extension piece.

The props would be set up in spaced relationship and would preferably be positioned relatively to each other and laced together by means of horizontally positioned tie-rods engaging at their ends in sockets attached to the props.

For example the support platform may be of generally square form having upturned corners to provide four upstanding projections as described in our co-pending application of even date herewith and each extension piece may have one end formed so that it can be slidden between a pair of upstanding projections so as to be trapped between the platform below and the adjacent edges of two pans above.

Such extension piece may be in the form of a short box section girder provided at one end with a projecting flange which is of the same or less width than the width of the girder and which extension piece is provided at the other end with an extending flange in the horizontal plane and projecting laterally at each side of the girder so as to form a means for locating it against transverse movement by engagement with a vertical face on a surrounding wall or a beam or by engagement with the vertical side of another extension piece upon which the horizontal flange is resting.

In order to illustrate the present invention in more detail there is hereinafter described one example of a shuttering system embodying the invention although it will be appreciated that the details hereinafter are to be taken by way of example only and are not considered to be limiting upon the scope of the invention.

The props used in the shuttering system may be any suitable form of adjustable prop or in some cases ordinary scaffold poles of fixed height may be used. Each such prop has its upper end formed to receive a spigot member on the underside of a support platform which is adapted to be placed on the top of the prop.

Such supporting platform comprises a flat plate having four upstanding projections and on its underside provided with a spigot in the form of a short length of rod or bar welded to the underside of the plate and adapted to

be engaged in the upper end of the prop. The upstanding projections may be formed by forming a slot extending inwardly from each side of a square plate and bending up each partially severed portion of the plate to form four upstanding flat projections. Alternatively the projections may be formed by making two slots in each of a pair of opposite sides of a flat plate and then bending up the metal of the plate at each corner between each slot and the adjacent side so as to form four upstanding flat lugs which are in two pairs in spaced parallel planes so that these two pairs of lugs, in addition to providing locating projection, also define a channel extending between the opposite sides of the platform for a purpose to be hereinafter referred to.

The pans which constitute the actual shuttering members may be made in various sizes but the standard form of pans for covering the major area to be shuttered may each be of square form and made by a flat piece of wood supported in a frame having its sides made from members of generally angle-section, connected by cross pieces which may be of angle or channel section.

The side members of the frame of each pan have a section which provides a fairly deep downwardly extending vertical flange which is spaced inwardly from a realtively short upper vertical flange the two being connected by a web which is inclined downwardly and outwardly so that when the piece of wood is placed in position in the frame it rests with its underside upon the portion of this web which is adjacent the inner vertical flange and the part of the web below the edge of the board is spaced away therefrom so as to leave a small gap. This has the advantage that it allows easy fitting of the board in position as the lower corner edges of the board do not have to fit into any sharp angle-section and the downwardly extending profile of this web has a further advantage referred to hereinafter. The deep vertical flange preferably has an inwardly extending lip at its lower edge for strengthening purposes.

In setting-up shuttering using the equipment above described, the props are first assembled and tied together, each prop having a support platform at its upper end and then a suitable number of the aforesaid pans are placed upon the support platform the corner of each pan being engaged over one or the upstanding lugs so that with the corners of four pans resting on one platform, each lug locates its associated pan against outward displacement whilst the presence of the adjacent pans prevents displacement in the other directions. It will be appreciated that a certain amount of tolerance may be allowed to facilitate easy assembly of the pans upon the support platform.

In order to bridge the gaps remaining between the area which can be covered by the standard size of pans and the surround which may be walls or beams, we provide extension pieces as aforesaid and each extension piece can be considered as a small box-section girder having at one end a piece of angle-section welded across the open end of the box-section so that one flange of the angle closes the end and forms a vertical face and the other flange of the angle forms a horizontal face which is flush with the upper face of the box secton, the width of this angle being slightly less than the width of the box section. The thickness of this flange is equal to the depth of the profile of the web of the shuttering pan frame above described.

At the other end of the extension piece a further angle section piece is welded across the open end of the box section, the width of this angle section piece being greater than the width of the box section so that it also provides a vertical face and horizontal flange which is flush with the upper face of the box section but projects laterally to each side of the box section at this end.

The dimensions of the box section are made so that it can be slidden into the gap between the vertical flanges of two adjacent pans which are supported upon a platform and with the upper face of the box section making contact with the downwardly extending profile of the aforesaid web on the angle section frame of each pan.

Hence to take an example:— to bridge the gap between the platform at the top of a prop and an adjacent wall, one end of an extension piece, being the end which has the small flange, is slidden between the vertical flanges of the two adjacent pans engaged upon the platform and positioned so that the larger angle section at the other end of the extension piece can be engaged upon the edge of the wall, the horizontal flange resting upon the wall and the vertical flange engaging the face of the wall so as to locate the extension piece accurately at right angles to the wall.

A similar extension piece is engaged in a similar fashion on an adjacent prop so that there are now two extension pieces bridging the gap between these two props and the wall. The space between these two extension piece can then be bridged by one or more further extension pieces by engaging the horizontal flanges at each end of an extension piece upon the flat upper surfaces of the box sections of the two first mentioned extension pieces and the area thus enclosed can be filled in with one or more pieces of wooden board.

When such wooden boards are placed in position they are raised above the surface of the box section extension piece by the width of the flange which is resting upon the extension piece so that they are brought into the same level as the wooden boards in the standard pans which are also above the upper surface of the box section extension pieces by

a distance corresponding to the downwardly extending profile of the web in the angle section frame of the scaffold pans. Thus, this particular profile of the angle section frame is of importance in ensuring that the whole area of shuttering is in a single plane.

The above described application is only one example of one mode of using the equipment of the present invention as it will be appreciated that there are various manners in which the extension pieces can be used to bridge gaps and other irregular shaped areas which may be encountered when providing shuttering for any particular job.

For example, an extension piece can be used in a position in which it is rotated through 180° about its axis as compared to the above described arrangement so that at the one end having the small flange the extension piece could rest upon a platfrom with the other end, having the larger flange, resting upon the top of a wall, beam, joist or like support to which it may be secured, such as by screws passing through the flange.

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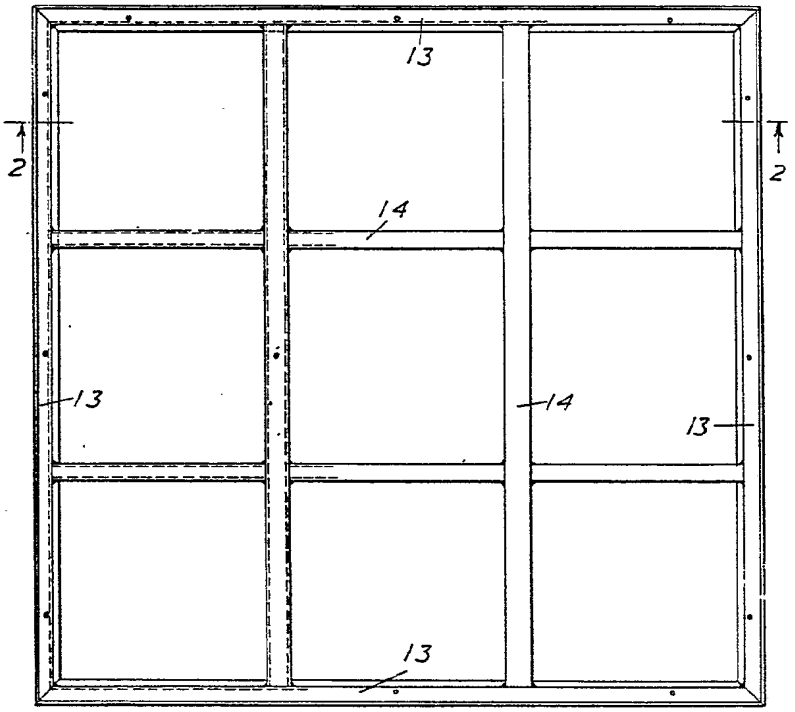

Fig. 1.

Fig. 2.

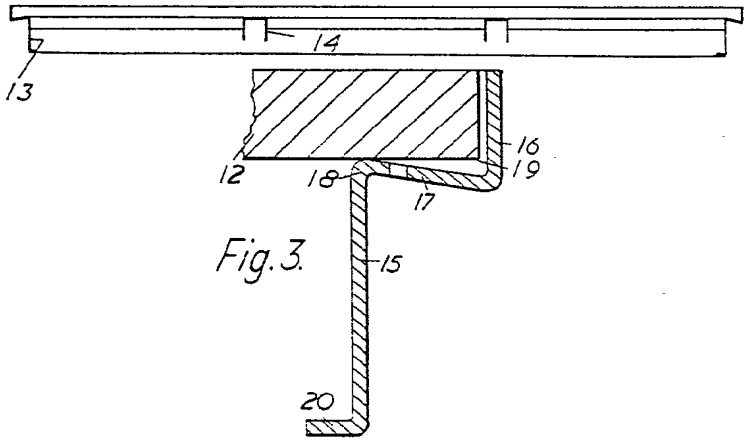

Fig. 3.

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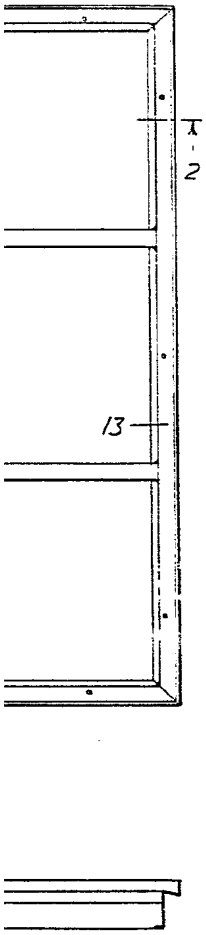

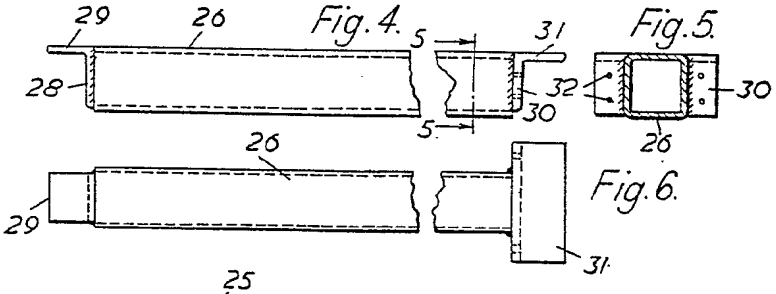

Fig. 4.

Fig. 5.

Fig. 6.

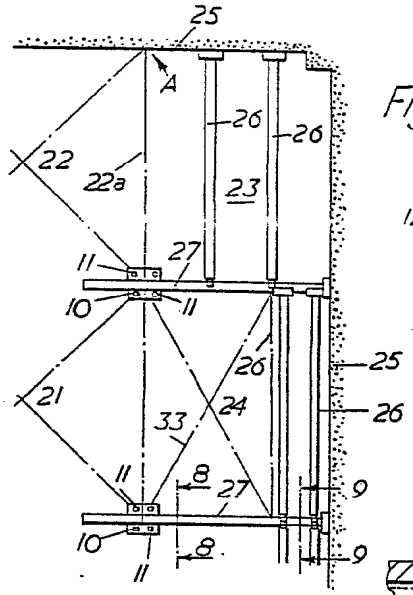

Fig. 7.

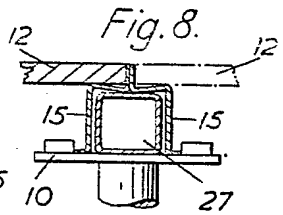

Fig. 8.

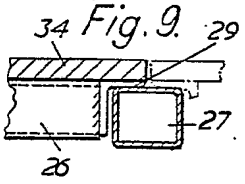

Fig. 9.

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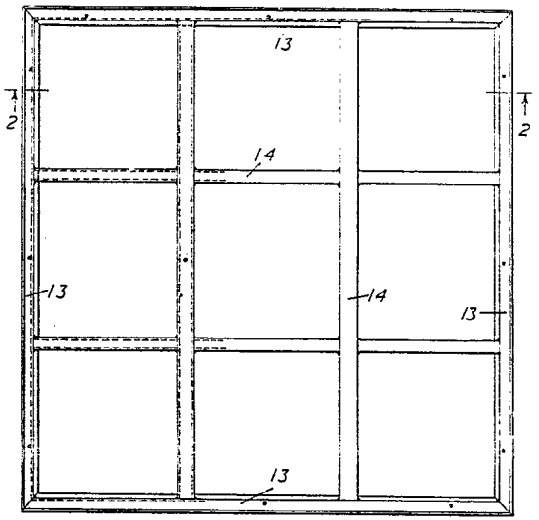

Fig. 1.

Fig. 2.

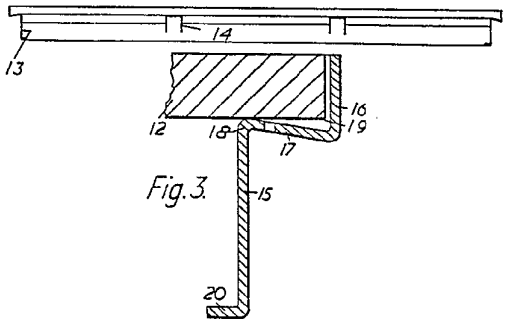

Fig. 3.

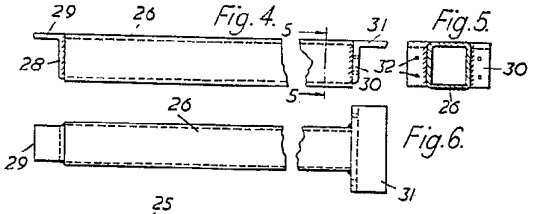

Fig. 4.

Fig. 5.

Fig. 6.

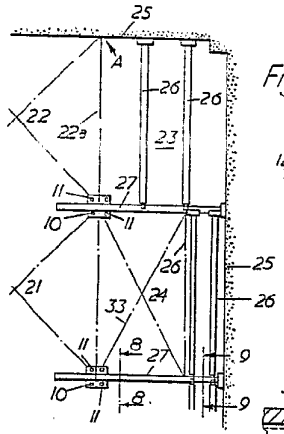

Fig. 7.

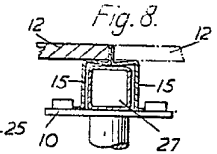

Fig. 8.

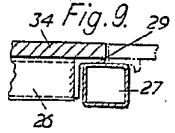

Fig. 9.